

(c) *Longitudinal trim.* The airplane must maintain longitudinal trim under each of the following conditions:

- (1) A climb with—
 - (i) Takeoff power, landing gear retracted, wing flaps in the takeoff position(s), at the speeds used in determining the climb performance required by § 23.65; and
 - (ii) Maximum continuous power at the speeds and in the configuration used in determining the climb performance required by § 23.69(a).

(2) Level flight at all speeds from the lesser of V_H and either V_{NO} or V_{MO}/M_{MO} (as appropriate), to $1.4 V_{S1}$, with the landing gear and flaps retracted.

(3) A descent at V_{NO} or V_{MO}/M_{MO} , whichever is applicable, with power off and with the landing gear and flaps retracted.

(4) Approach with landing gear extended and with—

- (i) A 3 degree angle of descent, with flaps retracted and at a speed of $1.4 V_{S1}$;
- (ii) A 3 degree angle of descent, flaps in the landing position(s) at V_{REF} ; and
- (iii) An approach gradient equal to the steepest used in the landing distance demonstrations of § 23.75, flaps in the landing position(s) at V_{REF} .

(d) In addition, each multiple airplane must maintain longitudinal and directional trim, and the lateral control force must not exceed 5 pounds at the speed used in complying with § 23.67(a), (b)(2), or (c)(3), as appropriate, with—

- (1) The critical engine inoperative, and if applicable, its propeller in the minimum drag position;
- (2) The remaining engines at maximum continuous power;
- (3) The landing gear retracted;
- (4) Wing flaps retracted; and
- (5) An angle of bank of not more than five degrees.

(e) In addition, each commuter category airplane for which, in the determination of the takeoff path in accordance with § 23.57, the climb in the takeoff configuration at V_2 extends beyond 400 feet above the takeoff surface, it must be possible to reduce the longitudinal and lateral control forces to 10 pounds and 5 pounds, respectively, and the directional control force must not exceed 50 pounds at V_2 with—

- (1) The critical engine inoperative and its propeller in the minimum drag position;
- (2) The remaining engine(s) at takeoff power;
- (3) Landing gear retracted;
- (4) Wing flaps in the takeoff position(s); and
- (5) An angle of bank not exceeding 5 degrees.

[Doc. No. 4080, 29 FR 17955, Dec. 18, 1964, as amended by Amdt. 23-21, 43 FR 2318, Jan. 16, 1978; Amdt. 23-34, 52 FR 1828, Jan. 15, 1987; Amdt. 23-42, 56 FR 351, Jan. 3, 1991; 56 FR 5455, Feb. 11, 1991; Amdt. 23-50, 61 FR 5189, Feb. 9, 1996]

STABILITY

§ 23.171 General.

The airplane must be longitudinally, directionally, and laterally stable under §§ 23.173 through 23.181. In addition, the airplane must show suitable stability and control “feel” (static stability) in any condition normally encountered in service, if flight tests show it is necessary for safe operation.

§ 23.173 Static longitudinal stability.

Under the conditions specified in § 23.175 and with the airplane trimmed as indicated, the characteristics of the elevator control forces and the friction within the control system must be as follows:

(a) A pull must be required to obtain and maintain speeds below the specified trim speed and a push required to obtain and maintain speeds above the specified trim speed. This must be shown at any speed that can be obtained, except that speeds requiring a control force in excess of 40 pounds or speeds above the maximum allowable speed or below the minimum speed for steady unstalled flight, need not be considered.

(b) The airspeed must return to within the tolerances specified for applicable categories of airplanes when the control force is slowly released at any speed within the speed range specified in paragraph (a) of this section. The applicable tolerances are—

- (1) The airspeed must return to within plus or minus 10 percent of the original trim airspeed; and